

AMENDMENTS TO THE CLAIMS

Claim 1 (Previously Amended): A multilayer thin film formed on an Si substrate by epitaxial growth, ~~which comprises~~ the multilayer thin film comprising:

a buffer layer formed on said Si substrate, ~~which~~ where said buffer layer includes

an oxide thin film of zirconium or of a rare earth element on said Si substrate;

a perovskite layer on said oxide thin film; and

an electrically conductive thin film on said perovskite layer,

a perovskite oxide thin film formed on said buffer layer, ~~which~~ where said perovskite oxide thin film has a (100) or (001) orientation, and

a ferroelectric thin film epitaxially grown on said ~~perovskite~~ perovskite oxide thin film.

Claim 2 (Original): The multilayer thin film of claim 1, wherein said perovskite oxide thin film has insulating properties.

Claim 3 (Canceled)

Claim 4 (Original): The multilayer thin film of claim 1, wherein said perovskite oxide thin film comprises PbTiO_3 .

Claim 5 (Previously Amended): The multilayer thin film of claim 1, wherein said ferroelectric thin film comprises PZT.

Claim 6 (Original): An electron device comprising a multilayer thin film as recited in claim 1.

Claim 7 (Previously Amended): A process for preparing the multilayer thin film of claim 1, comprising:

forming a buffer layer including an oxide thin film of zirconium or of a rare earth element on an Si (100) substrate,

epitaxially growing a perovskite oxide thin film having a (100) or (001) orientation on said buffer layer, and

epitaxially growing a ferroelectric thin film on said perovskite oxide thin film.

Claim 8 (Previously Added): The multilayer thin film of claim 1, wherein said buffer layer comprises ZrO_2 .

Claim 9 (Previously Added): The multilayer thin film of claim 1, wherein said buffer layer comprises Y_2O_3 .

SUPPORT FOR THE AMENDMENT

This Amendment cancels Claim 3; and amends Claim 1. Support for the amendments is found in the specification and claims as originally filed. In particular, support for "a perovskite layer on said oxide thin film" is found in the specification at least at page 9, lines 14-15. Support for "an electrically conductive thin film on said perovskite layer" is found in canceled Claim 3 and in the specification at least at page 8, line 32. No new matter would be introduced by entry of these amendments.

Upon entry of these amendments, Claims 1-2 and 4-9 will be pending in this application. Claim 1 is independent.

REQUEST FOR RECONSIDERATION

Applicants respectfully request entry of the foregoing and reexamination and reconsideration of the application, as amended, in light of the remarks that follow.

Applicants thank the Examiner for the courtesies extended to their representative during the June 20, 2003, personal interview.

As discussed at the interview, the present invention provides a multilayer thin film including a ferroelectric thin film having improved properties as a result of being epitaxially grown. The epitaxial ferroelectric thin film is formed of a perovskite oxide thin film having a (100) or (001) orientation, which is formed on a buffer layer. To form the perovskite oxide thin film, the buffer layer includes an oxide thin film of zirconium or of a rare earth element, a perovskite layer on the oxide thin film, and an electrically conductive thin film on the perovskite layer. The perovskite layer on the oxide thin film is necessary to form a properly oriented electrically conductive thin film and perovskite oxide thin film having a (100) or

(001) orientation on which the ferroelectric thin film can be epitaxially grown. See, specification at page 9, lines 6-25.

Claims 1-9 are rejected under 35 U.S.C. § 102(b) over U.S. Patent No. 5,834,803 ("Nashimoto-803"). In addition, Claim 3 is rejected under 35 U.S.C. § 803(a) over Nashimoto-803 in view of U.S. Patent No. 5,776,621 ("Nashimoto-621").

Nashimoto discloses a second ferroelectric thin film 3 on a first ferroelectric thin film 2 on a buffer layer 5 on a substrate 1. See, e.g., Nashimoto-803 at Fig. 4.

Nashimoto-621 discloses a PbTiO_3 perovskite layer 4 on a Pt layer 3 on a MgO layer 2 on a GaAs substrate 1.

However, the cited prior art is silent about and fails to suggest the limitation of independent Claim 1 of a buffer layer including "an oxide film thin of zirconium or of a rare earth element" on a Si substrate, "*a perovskite layer on said oxide thin film*", and "an electrically conductive film thin on said perovskite layer".

Thus, the prior art rejections should be withdrawn.

Claim 1 is objected to for various informalities. To obviate the objections, Claim 1 is amended.

Applicants respectfully request that the Examiner acknowledge receipt of the certified copy of the priority document filed August 21, 2001. The Office Action dated June 25, 2002 inadvertently failed to check Box 13)a) ("All") prior to checking Box 13)a)1. ("Certified copies of the priority documents have been received.").

In view of the foregoing amendments and remarks, Applicants respectfully submit that the application is in condition for allowance. Applicants respectfully request favorable consideration and prompt allowance of the application.

Should the Examiner believe that anything further is necessary in order to place the application in even better condition for allowance, the Examiner is invited to contact Applicants' undersigned attorney at the telephone number listed below.

Respectfully submitted,

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